

# Claims

- [c1] 1. A process for the retention and drainage of a stock useful for the manufacturing of paper, paperboard, cardboard and other similar products, comprising the steps of:
- (1) adding a secondary retention and drainage agent that is capable of retaining fines, colloidal and semi-colloidal particles, and organic and inorganic compounds present in the stock, and then, optionally,
  - (2) adding a primary retention and drainage agent selected from the group consisting of a linear, branched, or cross-linked polyacrylamide, a starch, a polyethylene oxide, a wet strength resin, dry strength resin, an organic or inorganic coagulant, and three-dimensional modeling polymer, which is able to flocculate the stock.
- [c2] 2. The process according to Claim 1 wherein the secondary retention and drainage agent can be added at a point in the process selected from:
- Point 1b, at the suction of the stock tank pump 30;
  - Point 3, at the level box 50;
  - Point 4, at the suction of the stock pump 60 feeding the stock depuration stage 100;

Point 5, at other paper stock depuration stages 120;  
Point 6, at the outlet of the first stage of stock depuration 110;  
Point 8, at the dilution water supply 70 before the entry of the depurated stock;  
Point 9, before the fan pump 80;  
Point 10a, before the pressure screen 90;  
Point 10b, inside the pressure screen 90; and  
Point 10c, after the pressure screen 90.

- [c3] 3. The process according to Claim 1 wherein the primary retention and drainage agent can be added at a point in the process selected from before a fan pump, and before, inside and after a pressure screen of the paper machine.
- [c4] 4. The process according to claim 2 wherein the secondary retention and drainage agent is added in a continuous way.
- [c5] 5. The process according to Claim 1 wherein the secondary retention and drainage agent is added at a level in a range between 40 and 2,000 g/ton produced paper.
- [c6] 6. The process according to Claim 1 wherein the secondary retention and drainage agent is added at a level in a range between 150 and 1,000 g/ton produced pa-

per, and wherein the level of smectite added is in a range between 150 and 1,000 g/ton produced paper.

[c7] 7. The process according to Claim 1 wherein the secondary retention and drainage agent is added to the stock in an acid, neutral or alkaline environment.

[c8] 8. The process according to Claim 1 wherein the composition of the secondary retention and drainage agent comprises by weight:

(1) from about 1 to about 80% a dispersing agent;

(2) from about 8 to about 50% smectite; and

(3) from 0 to about 92% water;

the composition having a temperature in the range of from 5 to approximately 95° C.

[c9] 9. The process of Claim 8, wherein the dispersing agent is selected from the group consisting of a polyacrylate, a purified sulpholignin, an extract of seaweed, a protein, a condensed fatty acid, a sulphonate ester, a high molecular weight alkyl sulphate, a polycarboxylic compound, a phosphate preferably hexametaphosphate, pyrophosphate, and tripolyphosphate, a polyaspartic acid alkali salt, and alcohol, an acetone and other lower ketone, and glycerin.

[c10] 10. The process according to claim 8 wherein the smec-

tite comprises a montmorillonite.

- [c11] 11. The process of claim 8 wherein the composition of the secondary retention and drainage agent comprises by weight:
- (1) about 9.1% a dispersing agent;
  - (2) about 24.5% smectite, preferably a montmorillonite; and
  - (3) about 66.4% water;
- the composition having a temperature in the range of from about 40° C to about 60° C.
- [c12] 12. The process of Claim 1 wherein a composition comprising the secondary retention and drainage agent is prepared in a supplier's plant, and is brought to the paper plant for use.
- [c13] 13. The process of Claim 1 wherein the secondary retention and drainage agent comprises a smectite, or a chemically modified version thereof, preferably a normal, activated or modified bentonite.
- [c14] 14. The process according to Claim 1 wherein the primary retention and drainage agent can be added in the process between point 1a into a refined or non-refined stock tank, and point 10c, into the exit of the pressure screen 90.

- [c15] 15. The process of Claim 14 wherein the primary retention and drainage agent can be added continuously at a point in the process selected from:  
point 9, into a fan pump 80;  
point 10a, into the entry of a pressure screen 90;  
point 10b, into the interior of the pressure screen 90;  
and  
point 10c, into the exit of the pressure screen 90.
- [c16] 16. The process of Claim 1 wherein the primary retention and drainage agent is added at a level in a range between 50 and 10,000 g/ton produced paper.
- [c17] 17. The process of Claim 16 wherein the primary retention and drainage agent is added at a level in a range between 100 and 6,000 g/ton produced paper.
- [c18] 18. The process of Claim 1 wherein the primary retention and drainage agent is selected from the group consisting of a linear polyacrylamide, a branched polyacrylamide, a cross-linked polyacrylamide, a starch, a polyethylene oxide, a wet strength resin, a dry strength resin, an organic or inorganic coagulant, a polyvinylamine, and another three-dimensional modeling or architecture polymer.
- [c19] 19. The process of Claim 1, wherein the step of adding

the primary retention and drainage agent precedes the step of adding the secondary retention and drainage agent.

[c20] 20. The process of Claim 1, comprising only the step of adding the secondary retention and drainage agent.